In the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-7 (cancelled).

8. (New) An apparatus for subjecting a fluid to irradiation by high intensity ultrasound, the apparatus comprising a generally cylindrical vessel, and a multiplicity of ultrasonic transducer means for radiating ultrasonic waves at a frequency above 10 kHz into a fluid in the vessel, said transducer means being attached to an outer wall of the vessel in an array that extends both circumferentially and longitudinally, characterized by the vessel being large enough that each of said multiplicity of ultrasonic transducer means radiates into fluid at least 0.1 m thick, each of said transducer means being connected to a signal generator means for radiating no more than 3 W/cm^2, each of said transducer means being sufficiently close to each other, and the number of said transducer means being sufficiently high, that the power dissipation within said vessel is at least 25 W/liter but no more than 150 W/liter.

9. (New) An apparatus as claimed in claim 8 wherein the power radiated by each of said transducer means is in the range 1-2 W/cm^2.

10 (New) An apparatus as claimed in claim 8 wherein the number of said transducer means , the power of each of said transducer means , and the volume of the vessel are such that the

power density is between 40 and 80 W/litre.

11. (New) An apparatus as claimed in claim 8 wherein the vessel is double walled, with an inner wall and an outer wall with a space between them, said transducer means being attached to the outer wall, the fluid to be treated is enclosed within the inner wall, and the space between the two walls is filled by a low attenuation buffer liquid whose cavitation threshold is above that of the liquid to be treated.

12. (New) An apparatus as claimed in claim 8 comprising a plurality of said ultrasonic signal generator means , each signal generator means being arranged for energizing a separate group of said transducer means.

13. (New) An apparatus as claimed in claim 12 wherein, in each said group, each of said transducer means are adjacent to each other.

14. (New) An apparatus as claimed in claim 12 wherein said transducer means are disposed in groups and at least one group of said transducer means resonates at a different frequency to other groups of transducer means, and each signal generator means is arranged for energizing the respective group of the transducer means at their resonant frequency.

15. (New) An apparatus as claimed in claim 13 wherein at least one group of said transducer means resonates at a different frequency to other groups of said transducer means, and each signal generator means is arranged for energizing the respective group of said transducer means at their resonant frequency.

16. (New) A method for subjecting a fluid to irradiation by high intensity ultrasound, said method comprising the steps of:

selecting a generally cylindrical vessel having a diameter greater than 0,1 m;

attaching a multiplicity of ultrasonic transducer means to the wall of the vessel in an array that extends both circumferentially and longitudinally;

enclosing the fluid within the vessel;

connecting each transducer to a signal generator, and

energizing the transducers so that ultrasonic waves at a frequency above 10 kHz are radiated into the fluid within the vessel,

the improvement wherein each transducer means is arranged for radiating at a power intensity adjacent to the wall no more than 3 W/cm^2, and wherein said transducer means are sufficiently close to each other and the number of transducers are sufficiently high for limiting power dissipation within the vessel between at least 25 W/litre to no more than 150 W/litre.

17. (New) A method as claimed in claim 16 wherein the power radiated by each of said transducer means is in the range 1-2 W/cm^2.

18. (New) A method as claimed in claim 16 wherein the number of transducer means, the power of the transducers, and the volume of the vessel are such that the power density is between 40 and 80 W/liter.

19. (New) A method as claimed in claim 16 wherein the vessel is double walled, with an inner wall and an outer wall with a space between them, said transducer means being attached to the outer wall, the fluid to be treated is enclosed within the inner wall, and the space between the two walls is filled by a low attenuation buffer liquid whose cavitation threshold is above that of the liquid to be treated.

20. (New) A method as claimed in claim 16 including the step of providing a plurality of ultrasonic signal generators, each signal generator being arranged to energize a separate group of said transducer means.

21. (New) A method as claimed in claim 20 wherein, in each said group, said transducer means are adjacent to each other.

22. (New) A method as claimed in claim 20 wherein at least one group of transducer means resonates at a different frequency to other groups of said transducer means, and each signal generator is arranged to energize the respective group of the transducer means at their resonant frequency.

23. (New) A method as claimed in claim 21 wherein at least one group of said transducer means resonates at a different frequency to other groups of said transducer means, and each signal generator is arranged to energize the respective group of transducer means at their resonant frequency.

24. (New) An apparatus for subjecting a fluid to irradiation by high-intensity ultrasound, the apparatus comprising a generally cylindrical vessel, and a multiplicity of ultrasonic

transducers attached directly to the outside of a wall of the vessel in an array of separate transducers that extends both circumferentially and longitudinally for irradiating ultrasonic waves at a frequency above 10 kHz into a fluid in the vessel, wherein the vessel is large enough that each transducer radiates into fluid at least 0.1 m thick, each transducer being connected to a signal generator means arranged so the transducer radiates no more than 3 W/cm^2, the transducers being sufficiently close to each other, and the number of and proximity to each other of the transducers being such that the power dissipation within the vessel from said multiplicity of transducers is at least 25 W/liter but no more than 150 W/liter.